The University of Jordan
School of Engineering
Department of Computer Engineering
Fall Term – A.Y. 2020 - 2021

Course:	Parallel Processing – 0907536 (3 Credit Hours)
Catalog Data:	Basic Concepts. Introduction to Parallel Systems. Parallelism in Hardware (Multithreading, Multicore, Multiprocessors, GPU Accelerators, Vector Instruction Sets). Parallel Programming Platforms and Models. Paradigms for Parallel Algorithms. Principles of Parallel Algorithm Design. Parallel Algorithms and Applications. Data Structures for Parallel Computing. Dense Matrix Algorithms. Array-Based SIMD Architectures. Sorting Algorithms. Graph Algorithms. Decision Trees and Diagrams. Fast Fourier Transform Algorithms. Numerical Algorithms. Emerging Techniques in Parallel Computing.
Prerequisites by Course:	Computer Architecture and Organization (2) [CPE 0907432] & Data Structures and Algorithms [CPE 0907346].
Prerequisites by Topic:	Students are assumed to have had sufficient knowledge pertaining to object-oriented programming and computer organization and architecture.
Textbook:	A. Grama, A. Gupta, G. Karypis, and V. Kumar, *Introduction to Parallel Computing*, 2nd edition, Pearson, 2003.
References:	. C. Xavier and S. S. Iyengar, *Introduction to Parallel Algorithms*, Wiley, 1998. . C. Lin and L. Snyder, *Principles of Parallel Programming*, Addison-Wesley, 2008.
Website:	http://eacademic.ju.edu.jo/a.alrabadi
Schedule & Duration:	16 Weeks, 48 lectures, 60 minutes each (including exams).
Minimum Student Material:	Text book, class handouts, some instructor keynotes, calculator and access to a personal computer and internet.
Minimum College Facilities:	E-learning platform, classroom with whiteboard and projection display facilities, library and computational facilities.
Course Objectives:	The objectives of this course are: 1. Introducing students to modern parallel processing systems. 2. Introducing students to parallel SIMD architectures. 3. Introducing students to parallel FFT and numerical algorithms. 4. Introducing students to parallel graph-based algorithms. 5. Introducing students to parallel array manipulation algorithms.
Course Outcomes and Relation to ABET Program Outcomes:	Upon successful completion of the course, a student should be able to: 1. Implement the various parallel – based problem solving techniques for specific applications. 2. Recognize the continuous important updates of contemporary issues in parallel computing.
Course Topics:	1. Introduction to Parallel Systems 2. Parallelism in Current Hardware 3. Parallel Programming Platforms and Models 4. Paradigms for Parallel Algorithms

5. Principles of Parallel Algorithm Design
6. Applications of Parallel Algorithms
7. Data Structures for Parallel Computing
8. Dense Matrix Algorithms
9. Array-Based Parallel SIMD Architectures
10. Parallel Sorting Algorithms
11. Parallel Graph-Based Algorithms
12. Parallel Decision Trees and Diagrams
13. Parallel FFT and Numerical Algorithms
14. Emerging Techniques in Parallel Computing

Computer Usage: Practical aspects of this course are covered in Engineering Problem Solving with Matlab and OOP with Java.

Attendance: Class attendance will be taken every class and the university's polices will be enforced in this regard.

Assessments: Exams and Course Work.

Grading policy:

Course Work	20%
Midterm Exam	30%
Final Exam	50%

Instructors:

Prof. Dr. Eng. Anas N. Al-Rabadi
a.alrabadi@ju.edu.jo
Office Hours: S. T. Th. 11:00 – 12:00
M. W. 10:00 – 11:00

Class Time and Location: S. T. Th. 9:30 – 10:30 CE 001